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flasks were opened. No living bacteria were present in any of them, nor were the fluids able to produce tubercles when added to the roots of plants growing in sterile earth. Under these conditions the germs were not able to assimilate free nitrogen.

8. It is not clear in just what way the tubercles originate. Their production is due to the action of specific organisms, but these are not always capable of causing them, as the frequent failures showed. The author was not able to produce them by direct inoculations, not even in the tissues of young roots and stems. He thinks that possibly infection takes place only through young root hairs. Contrary to Laurent, the time of year makes no difference; neither does the age of the plant, as Nobbe has also shown, since tubercles were obtained both on the roots of seedlings and on those of well-developed plants. Gain's observation that infections are more numerous in a damp soil is confirmed.

ERWIN F. SMITH.

**Recent Studies of Asarum.**—The wild gingers of the Eastern and Middle United States, concerning the specific definition of which some doubt has long been felt, form the subject of papers by Bicknell in the *Bulletin of the Torrey Botanical Club* for November last, Ashe in the first part of the current volume of the *Journal of the Elisha Mitchell Scientific Society*, and Kraemer in the *American Journal of Pharmacy* for March. In commenting on some of these papers in the *Journal of Botany* for March, James Britten and Edmund Baker analyze the synonymy of certain of the species and call rather emphatic attention to the desirability of consulting types in serious systematic work. Some slight bibliographic confusion is likely to result from the publication of Mr. Ashe's paper in separate form long enough before the number of the *Journal* containing it was issued to enable him to revise the latter into quite a different article. T.

**Combs's Flora of Santa Clara Province, Cuba.**—The island of Cuba is one of considerable interest to the botanist, as is shown by the rich collections made by many early explorers. In recent years, however, the region seems to have been neglected. We have before us a contribution of considerable length devoted to the flora of Cienfuegos, province of Santa Clara, by Robert Combs.<sup>1</sup> The author enumerates 713 species, of which *Caesalpinia cubensis*, *Acacia*

<sup>1</sup> Plants Collected in the District of Cienfuegos, Province of Santa Clara, Cuba, in 1895-1896. *Trans. Acad. Sci. of St. Louis*, 7: 393-491, pls. 30-39, one map, 1897. (Contributions Botanical Department, Iowa State College of Agric. and Mechanic Arts, No. 7.)